

# **FACT SHEET FOR NPDES PERMIT WA-002928-9 BREMERTON WASTEWATER TREATMENT PLANT**

## **SUMMARY**

The City of Bremerton owns, operates, and maintains two wastewater treatment plants – the Westside Wastewater Treatment Plant (West Plant) and the Eastside Wastewater Treatment Plant (East Plant). The West Plant is a secondary wastewater treatment plant which operates year round, and treats waste water from all of the City’s sewer service area. During wet weather periods, the West Plant receives and treats combined sewage (sanitary sewage combined with storm water). The East Plant operates only during wet weather periods and treats combined sewage only. Combined sewage from East Bremerton is diverted to the East Plant when the volume of combined sewage exceeds the capacity of sewage conveyance system to the West Plant. The East Plant was constructed to reduce frequency of combined sewage overflows (CSOs) from the City’s sewerage system to an average of one per year per outfall as required by the state regulations.

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## INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the Wastewater Discharge Permit Program.

The regulations adopted by Washington State include procedures for issuing permits (chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (chapter 173-221 WAC), water quality criteria for surface and ground waters (chapters 173-201A and 200 WAC), and sediment management standards (chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty (30) days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A—Public Involvement of the fact sheet for more detail on the public notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix H—Response to Comments.

GENERAL INFORMATION	
Applicant	City of Bremerton 345 – 6 <sup>th</sup> Street, Suite 600 Bremerton, WA 98337
Facility Name and Address	(a) Westside Wastewater Treatment Plant (West Plant) 1600 Oyster Bay Road Bremerton, WA 98312  (b) Eastside Wastewater Treatment Plant (East Plant) 2475 Stephenson Avenue Bremerton, WA 98310
Type of Treatment	(a) West Plant: Activated Sludge - Secondary Treatment System  (b) East Plant: High Rate Clarification (HRC) – Combined Sewage Treatment System
Discharge Location	(a) West Plant: Sinclair Inlet, Puget Sound Latitude: 47° 32' 59" N Longitude: 122° 40' 11" W  (b) East Plant: Port Washington Narrows, Puget Sound Latitude: 47° 34' 57" N Longitude: 122° 37' 45" W
Waterbody ID Number	(a) West Plant: 1224026474620 (b) East Plant: 1224026474620

## BACKGROUND INFORMATION

### DESCRIPTION OF THE FACILITY

#### 1. WASTEWATER SOURCES

- (a) West Plant: The West Plant receives domestic sewage from residential and light commercial activities in the city of Bremerton and Kitsap County Sewer District Number 1. The plant also receives waste water from Harrison Memorial Hospital, and domestic and industrial wastewater from Puget Sound Naval Shipyard (PSNS). The domestic wastewater from PSNS includes waste water from on-shore chemical toilet facilities and saline wastewater from toilet facilities on ships. The industrial wastewater from PSNS includes pretreated wastewater from the industrial wastewater treatment facility. This discharge is covered under a State Waste Discharge Permit No. ST-7274. The plant receives and treats combined sewage during wet weather periods.
- (b) East Plant: The East Plant operates only during wet weather periods and treats combined sewage only. Combined sewage from East Bremerton is diverted to the East Plant when the volume of combined sewage exceeds the capacity of sewage conveyance system to the West Plant. The East Plant was constructed to reduce the frequency of combined sewage overflows (CSOs) from the City's sewerage system to an average of one per year per outfall as required by the state regulations, WAC 173-245.

#### 2. DESCRIPTION OF THE WASTEWATER COLLECTION SYSTEM

The wastewater collection system in Bremerton has been constructed in various phases as a result of changing regulations coupled with occasional rapid population growth and new development over the course of nearly 100 years. There are 36 pump stations and 15 combined sewer overflow (CSO) outfalls in the collection system.

Bremerton's separate and combined sanitary sewer collection system mains range in size from 6 to 42 inches in diameter for gravity mains and from 4 to 36 inches in diameter for force mains. The sewers have been constructed with a variety of materials including clay, concrete, PVC, asbestos cement, cast iron, ductile iron, and HDPE. Approximately 60 percent of the sewer system is composed of combined sewers and, consequently, inflow (storm water) represents a significant portion of the total sewage flow during wet weather months. Most of the combined sewage is received and treated at one of the two treatment plants.

Sewage in East Bremerton is collected from six sewer basins through a series of pump stations, gravity pipelines, and pressure mains that discharge to the East Bremerton beach main. The flow from the beach main gravity sewer discharges to 16-inch and 24-inch siphons under Port Washington Narrows, to pump station CE-1. Pump station CE-1 pumps the sewage to the West Plant via the Cross-town Pipeline.

During wet weather periods, combined sewage from East Bremerton is diverted to and treated at the East Plant when the volume of combined sewage exceeds the capacity of sewage conveyance system to the West Plant.

In West Bremerton, separate and combined sewage systems flows from various basins, as well as flows from East Bremerton are pumped into the Cross-town Pipeline system, which conveys flows to the West Plant.

### 3. DESCRIPTION OF THE WASTEWATER TREATMENT PLANT

- (a) West Plant: The treatment system at this plant consists of an activated sludge (plug flow with an anaerobic selector zone) secondary treatment system. The liquid stream treatment system includes three mechanical bar screens, two aerated grit chambers, two primary clarifiers, a roughing biofilter (currently not in use), two aeration basins with fine bubble diffusers, two secondary clarifiers, two chlorine contact basins for sodium hypochlorite disinfection system, and a sodium bisulfite dechlorination system.

The solids stream treatment system components at this plant include a gravity thickener (currently not in use), a dissolved air flotation thickener (DAFT), two anaerobic digesters, and a centrifuge. Primary sludge (solids removed in the primary clarifiers) is sent directly to the anaerobic digesters. Secondary sludge (solids removed in the secondary clarifiers) is thickened in the DAFT prior to sending it to the anaerobic digesters. Primary and secondary sludge are digested in the two anaerobic digesters operated as primary digesters. Digested sludge is dewatered in the centrifuge. The dewatered digested sludge (biosolids) is spread on permitted forest lands owned by the City. The recycle wastewater stream, which includes DAFT underflow, digesters supernatant, and centrate from the centrifuge, is returned to the head of the plant for further treatment.

An odor control system consisting of three packed tower chemical odor scrubbers was installed at the plant in 1996, in order to process odorous air generated from various treatment units. These include headworks (bar screens and grit removal units), primary clarifiers, gravity thickener, DAFT system, digester complex, centrifuge area, biofilter, aeration basin headworks, RAS wet well, and primary and secondary scum boxes.

- (b) East Plant: The treatment system at this plant consists of a High Rate Clarification (HRC) system to treat combined sewage from East Bremerton. Treatment components at the facility include a 100,000-gallon storage tank, an HRC system, and an ultraviolet (UV) light disinfection system. Solids removed at this plant are stored in the storage tank. When capacity becomes available in the sewer system, the solids are conveyed to the West Plant for removal and treatment.

Waste water from East Bremerton is normally treated at the City's West Plant. This includes sanitary sewage during dry weather months and combined sewage during wet weather months. Waste water from East Bremerton is conveyed by two inverted siphons across Port Washington Narrows (which separates East and West Bremerton) to pump station CE-1. Waste water is then pumped to the West Plant via the Cross-town Pipeline. During wet weather periods, when the combined sewage volume exceeds the capacity of the inverted siphons, it is diverted through a 20-inch pipe to the East Plant. The treatment system at the East Plant starts automatically when the in-line storage capacity has been exhausted and the 100,000 gallons capacity (short-term) storage tank is nearing full.

If the capacity of the inverted siphons starts to free up before the in-line storage capacity is exhausted and short-term storage tank becomes full, the combined sewage drains back to the siphons and then to the pump station CE-1. The East Plant does not begin operating under these circumstances.

The East Plant pages the on-call operator through the Programmable Logic Control (PLC) system when the level in the storage basin reaches 7.6 feet, and the operator is dispatched to monitor, in-person, operation of the East Plant. The East Plant begins start-up at a level of 13.4 feet in the storage basin, and flow enters the plant at a level of 13.66 feet. The East Plant began operation in January 2003. It operated fourteen times in 2003, three times in 2004, and six times in 2005.

Layouts for both treatment plants are included in Appendix C.

#### 4. DESCRIPTION OF THE DISCHARGE OUTFALL

- (a) West Plant: Secondary treated effluent from the West Plant is discharged to Sinclair Inlet, Puget Sound, at a location west of Puget Sound Naval Shipyard (PSNS), via a 36-inch diameter outfall, which extends 568 feet offshore. The terminal portion of the outfall consists of a 20-port diffuser with 6.5-inch diameter openings at 6-foot spacing. The diffuser ports discharge horizontally in alternating directions at a depth of approximately 30 feet below Mean Lower Low Water (MLLW).
- (b) East Plant: Treated effluent is discharged to Port Washington Narrows, Puget Sound. The discharge outfall is approximately 480 feet long. The first 200 feet of the outfall consists of a 20-inch diameter cast iron pipe, and the remaining outfall and diffuser consist of a 36-inch diameter reinforced concrete pipe. The diffuser portion of the outfall is equipped with twenty-one 5.75-inch diameter ports. The ports are located on alternating sides of the pipe at 4-foot spacing. Discharge into Port Washington Narrows is at a depth of approximately 24 feet below MLLW.

#### 5. RESIDUAL SOLIDS

- (a) West Plant: Screenings and grit removed at the West Plant are transported to the Olympic View Sanitary Landfill for disposal. Biosolids generated at the West Plant are utilized on forest lands owned by the City. The biosolids application/utilization sites are permitted by the Bremerton-Kitsap County Health District.

Primary sludge and secondary sludge (after thickening in dissolved air flotation thickener – DAFT) are digested in anaerobic digesters. The digested sludge is dewatered in a centrifuge. The dewatered digested sludge (biosolids) is utilized as fertilizer to enhance timber growth, as well as an amendment to improve overall soil quality.

- (b) East Plant: Screenings and sludge generated at the East Plant are stored in the storage tank and transported to the West Plant when the conveyance system capacity becomes available and the waste water begins flowing back to the West Plant.

## 6. WET WEATHER OPERATIONS – WEST PLANT

The wastewater treatment system at the West Plant is designed for a maximum month flow of 10.1 million gallons per day (MGD) and a peak hourly flow of 32.1 MGD. However, plant operations over the years have shown that the plant can operate at higher flows and still be able to comply with the effluent limits. As part of the CSO reduction efforts, the Permittee has been conveying more combined sewage to the West Plant for treatment. The plant has occasionally operated at peak flows greater than 50 MGD during wet weather. The Permittee has submitted a rerating study to the Department requesting approval of higher design flow criteria for the plant. In addition to demonstrating higher influent design flow capacity for the plant, this study indicates that, during wet weather months when the influent flows are high, flows to the secondary treatment portion of the plant can be as high as 22.8 MGD without compromising the secondary treatment portion of the plant. The study recommends that flows greater than 22.8 MGD be bypassed around the secondary treatment and provided only primary treatment in order to preserve the integrity of the biota in the secondary treatment portion of the plant. Flows from the two separately treated streams would then be combined and disinfected prior to discharge.

EPA's 1994 *Combined Sewer Overflow Control Policy* allows for "CSO-related bypass" whereby, under certain conditions, the permit writer may allow wet weather flows to bypass secondary treatment (*Combined Sewer Overflow Guidance for Permit Writers*, EPA, August 1995, pp 4-34).

Condition S11 of the proposed permit, *Wet Weather Operations – West Plant*, allows secondary treatment bypass of flows greater than 22.8 MGD. The combined primary and secondary treated effluent is required to meet secondary treatment limits at all times. This alternative would ensure compliance with the permitted effluent limits without compromising the secondary treatment portion of the plant. There is no separate combined sewer overflow outfall at the plant site.

It should be noted that when the original facility plan for the West Plant was approved by the Department, it was with the understanding that the plant would operate in this manner as this was, and is, considered to be good engineering practice and an acceptable solution for treating a significant portion of the combined sewer overflow volume which occurs in the system during wet weather periods. The West Plant has been operating in this manner since 1986 when the secondary treatment system was constructed at the plant.

## PERMIT STATUS

- (a) West Plant: The existing permit for the West Plant expired on June 21, 2001. An application for permit renewal was received by the Department on December 21, 2000, and accepted on June 27, 2001. Due to administrative backlog, the existing permit was extended by the Department on June 27, 2001. The plant is currently operating under the terms and conditions of this permit.
- (b) East Plant: Construction of the East Plant was completed in December 2001. An application for a discharge permit was received by the Department on October 11, 2001, and has been accepted by the Department.

The existing permit is for the West Plant only. The proposed permit authorizes discharges from both plants.

#### *SUMMARY OF RECENT INSPECTIONS*

- (a) West Plant: A Class I inspection of the West Plant was conducted by the Department staff on September 29, 2005. In addition, a Class II inspection was conducted on June 25, 2002. The effluent looked clear at the time of Class I inspection. The effluent looked slightly turbid at the time of the Class II inspection. During the inspections, the plant appeared to be well operated and maintained.
- (b) East Plant: A Class I inspection of the East Plant was conducted by the Department staff on October 23, 2002. This plant operates only during wet weather periods when the volume of combined sewage exceeds the capacity of the inverted siphons (crossing Port Washington Narrows) that convey waste water from East Bremerton to West Bremerton. Due to lack of rain at the time of inspection, there was no combined sewage present in the collection system and hence, the plant was not operating.

The inspection reports are on file at the Northwest Regional Office (NWRO) of the Department.

#### *SUMMARY OF COMPLIANCE WITH THE EXISTING PERMIT*

Based on Discharge Monitoring Reports (DMRs) submitted to the Department, during the term of the existing permit (from July 1, 1996, to present) there have been thirteen violations of the effluent limits for BOD and TSS. The monthly average flow to the plant exceeded the influent design criteria four times during this period. The effluent limits violations and exceedance of the influent flow design criteria occurred between December 1996 and February 1999. Based on DMRs submitted to the Department, the Permittee has consistently remained in compliance with the effluent limits and there have been no exceedance of influent design criteria since February 1999.

#### *EFFLUENT CHARACTERIZATION*

The concentrations of pollutants in the discharge were reported in the NPDES application and in DMRs. The results of the effluent analyses are shown in the following table. The concentrations of conventional pollutants (BOD, TSS, and fecal coliform) shown in the table below are from the monitoring data for the year 2000. Ammonia, chlorine, and metals concentrations are from the monitoring data from July 1996 through July 2005. The reported concentrations of Bis (2-Ethylhexyl) Phthalate and 1,4-Dichlorobenzene are the averages of two sampling and analysis conducted during the permit term.

Parameter	Maximum Daily Effluent Concentration	Average Daily Effluent Concentration	Number of Samples	Comments
BOD <sub>5</sub>	34 mg/L	10 mg/L	156	
TSS	37 mg/L	11 mg/L	156	
Fecal Coliform	997/100 mL	36/100 mL	260	
Dissolved Oxygen	11.9 mg/L	7.7 mg/L	366	
Ammonia (NH <sub>3</sub> -N)		47 mg/L	443	
Chlorine Residual		0.04 mg/L	109	
Cyanide	0.013 mg/L		60	Most sample results are below Method Detection Limit (MDL).
Arsenic	0.0033 mg/L		60	
Cadmium	0.0008 mg/L		60	All but sample result below MDL.
Chromium	0.078 mg/L		60	Most sample results are below MDL.
Copper	0.0271 mg/L		60	
Lead	0.02 mg/L		60	Only four sample results are above MDL.
Mercury	0.00028 mg/L		60	Only two sample results are above MDL.
Nickel	0.016 mg/L		60	Most sample results are below MDL.
Selenium	< 0.05 mg/L		60	All sample results are below MDL.
Zinc	0.19 mg/L		60	
Bis (2-Ethylhexyl) Phthalate		0.00011 mg/L	2	
1,4-Dichlorobenzene		0.00325 mg/L	2	

## PROPOSED PERMIT LIMITATIONS

Federal and state regulations require that effluent limitations set forth in an NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the surface water quality standards (chapter 173-201A WAC), ground water standards (chapter 173-200 WAC), sediment quality standards (chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

### DESIGN CRITERIA – WEST PLANT

In accordance with WAC 173-220-150 (1) (g), flows or waste loadings shall not exceed approved design criteria.

The design criteria shown in the following table, for the West Plant, are taken from Plans and Specifications, April 1983, prepared by CH2M Hill and approved by the Department.

Parameter	Design Criteria
Average flow for the maximum month	10.1 MGD
BOD <sub>5</sub> influent loading for the maximum month	18,100 lb/day
TSS influent loading for the maximum month	22,600 lb/day

### TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in chapter 173-221 WAC (state). These regulations are performance standards that constitute all known, available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The effluent limitations for CSO treatment facilities are given in chapter 173-245 WAC (state). These regulations are performance standards that constitute all known, available and reasonable methods of prevention, control, and treatment by CSO treatment facilities.

- (a) West Plant: The technology-based limits for pH, fecal coliform, BOD<sub>5</sub>, and TSS, taken from chapter 173-221 WAC are shown in the following table:

Parameter	Limit
pH	Shall be within the range of 6.0 to 9.0 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
BOD <sub>5</sub> (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration (see note (ii) below) Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration (see note (ii) below) Average Weekly Limit = 45 mg/L

Note:

- (i) The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

Monthly average effluent mass loadings for BOD<sub>5</sub> and TSS = 10.1 MGD (maximum monthly design flow) x 30 mg/L (concentration limit) x 8.34 (conversion factor) = 2527 lb/day.

Weekly average effluent mass loadings for BOD<sub>5</sub> and TSS = 10.1 MGD (maximum monthly design flow) x 45 mg/L (concentration limit) x 8.34 (conversion factor) = 3791 lb/day.

- (ii) WAC 173-221-050 (3) states: *For domestic wastewater facilities, which receive flows from combined sewers, the Department shall decide on a case-by-case basis whether any attainable percent removal can be defined during wet weather. If it can be defined, the department will set an alternative percent removal effluent limitation for the wet weather period. A permittee who requests such alternative limits shall submit supporting documentation to the department.*

The influent BOD<sub>5</sub> and TSS concentrations shown in the monitoring data submitted by the Permittee from July 1996 through May 2005, show that the influent received at the plant during wet weather periods is dilute compared to that during dry weather periods. This is due to the presence of combined sewage in the Permittee's collection system during wet weather periods. The monitoring data show that from July 1996 through May 2005, the average influent BOD<sub>5</sub>

concentration was 15 percent higher during dry weather period and 10 percent lower during wet weather period compared to the average influent BOD<sub>5</sub> concentration for the whole period. Similarly, the average influent TSS concentration was 12 percent higher during dry weather period and 9 percent lower during wet weather period compared to the average influent TSS concentration for the whole period. This generally results in lower percent removal efficiencies for BOD<sub>5</sub> and TSS during wet weather periods. Analyses of the monitoring data from July 1996 through May 2005 show that the Permittee is generally able to maintain 75 percent removal efficiency at the plant for both BOD<sub>5</sub> and TSS.

The Permittee has in the past and is currently implementing various projects in its collection system to reduce combined sewer overflows (CSOs) into the state waters in order to comply with the state regulations of no more than an average of one CSO per year per CSO site. As a result of the ongoing CSO reduction projects, the plant influent during wet weather periods is expected to get more diluted, which in turn is expected to result in further reduction in percent removal efficiencies of BOD<sub>5</sub> and TSS. Therefore, percent removal efficiency of 65 percent for BOD<sub>5</sub> and TSS is proposed in this permit, for wet weather period (October through April), which is specified in footnote "b" of Permit Condition S1.A. It should be noted that the concentrations of effluent BOD<sub>5</sub> and TSS are still limited to a maximum of 30 mg/L, and that only the required percent removal efficiencies are reduced during wet weather periods in order to account for the expected (further) dilution of the plant influent due to the ongoing CSO reduction projects. It should also be noted that the plant is operated in a manner to maximize BOD<sub>5</sub> and TSS removals, and that the reduction in required percent removal limits will not compromise the plant performance or the actual BOD<sub>5</sub> and TSS percent removals at the plant. It would be possible to determine fairly accurately, the achievable percent removals for BOD<sub>5</sub> and TSS during wet weather periods based on plant performance after completion of the Permittee's CSO reduction program. In future permits, the Department will reevaluate the attainable percent removals for BOD<sub>5</sub> and TSS based on plant performance after completion of the Permittee's CSO reduction program.

As part of the CSO Reduction Program, the Permittee is conveying more combined sewage to the West Plant for treatment. This is expected to further dilute the plant influent. The percent removal efficiencies for BOD<sub>5</sub> and TSS during wet weather months will be reevaluated during the next permit renewal.

- (b) East Plant: The effluent limits for TSS and settleable solids, taken from chapter 173-245 WAC are shown in the following table.

Parameter	Limit
TSS	May not exceed fifty percent (50%) of the influent concentration
Settleable Solids	Less than 0.3 ml/l/hr

### *SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS*

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established surface water quality standards. The Washington State Surface Water Quality Standards (chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

#### NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving waterbody while remaining protective of aquatic life. Numerical criteria set forth in the water quality standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

#### NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The state was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other diseases and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

#### NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the state of Washington.

#### ANTIDegradation

The Washington State's Antidegradation Policy requires that discharges into receiving waters shall not further degrade the existing water quality of the water body. In cases where the natural conditions of receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when receiving waters are of higher quality than the criteria assigned, the existing water quality shall be protected. More information on the Washington State's Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

## CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic waterbody uses.

## MIXING ZONES

The water quality standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

## DESCRIPTION OF THE RECEIVING WATER

The West Plant discharges to Sinclair Inlet, Puget Sound, and the East Plant discharges to Port Washington Narrows, Puget Sound. Both these water bodies are designated as Class A - Marine Waters, in the vicinity of the respective outfalls. Characteristic uses of these water bodies include the following:

water supply (domestic, industrial, agricultural); stock watering; fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall meet or exceed the requirements for all, or substantially all, uses.

## SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for these discharges are summarized below:

Parameter	Criteria
Fecal Coliforms	14 organisms/100 mL maximum geometric mean
Dissolved Oxygen	6 mg/L minimum
Temperature	16 degrees Celsius maximum or incremental increases above background
pH	7.0 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts

The Federal Clean Water Act [Section 303(d)] requires the state to prepare a list of water bodies that do not meet water quality standards. This list is called the 303(d) list because the process is described in Section 303(d) of the Clean Water Act. The Department is required to submit the 303(d) list to the Environmental Protection Agency (EPA) for approval. After approval by the EPA, the Department is required to develop water cleanup plans, also known as total maximum daily loads or TMDLs, for each of the water bodies on the 303(d) list. The latest approved 303(d) list is the 2002/2004 303(d) list, which lists Sinclair Inlet for various parameters for both water and tissue mediums. The parameters listed for water medium in this list are dissolved oxygen (DO), fecal coliform, pH, and temperature.

Of the parameters listed for water medium in Sinclair Inlet in the 2002/2004 303(d) list, only DO is listed as Category 5; the rest are listed as Category 2, *Waters of Concern*. The parameters included in Category 2 of the 303(d) list are the ones that show some evidence of water quality problem, but not enough to require a TMDL study at this time. Additional monitoring for these parameters would need to be conducted to determine if a TMDL study needs to be conducted.

The Department, in the near future, is planning to conduct a TMDL study in Sinclair Inlet to address noncompliance with the water quality standards for DO. The results of the TMDL study will be used to determine whether waste load allocations for BOD and nutrients are necessary (nutrients can contribute indirectly to DO depression by stimulating phytoplankton growth).

Fecal coliform bacteria in Sinclair Inlet are listed as Category 2, *Waters of Concern*, on the 2004 303(d) list, also called the *Water Quality Assessment*. A fecal coliform TMDL was initiated in 2000 based on the 1998 303(d) listing of fecal coliform bacteria in Dyes and Sinclair Inlets. Though these listings are not on the 2004 303(d) list, the marine waters of nearshore areas of Sinclair and Dyes Inlets have been shown to be impaired through additional monitoring conducted for the TMDL and routine monitoring conducted by Kitsap County Health District and Washington State Department of Health. The Department of Ecology is continuing to develop the TMDL in a cooperative effort with Puget Sound Naval Shipyard (PSNS) in Bremerton and U.S. Environmental Protection Agency (EPA) Region 10. The Department plans to establish waste load allocations for fecal coliform bacteria from point sources (wastewater treatment plants and Municipal Phase II NPDES Stormwater Permittees) and load allocations for fecal coliform bacteria from nonpoint sources that discharge to Sinclair Inlet. If the fecal coliform waste load allocation for the West Plant results in lower than permitted effluent limits, the Department may impose the more stringent TMDL-based limits through permit modification or issuance of an Administrative Order. A reasonable time period will be given to the Permittee to make plant modifications, if needed, to comply with the more stringent limits.

#### CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. Acute and chronic mixing zones are authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in chapter 173-201A WAC. Mixing zone boundaries for discharges to estuaries such as Sinclair Inlet and Port Washington Narrows are defined as follows:

- (a) In estuaries, mixing zones, singularly or in combination with other mixing zones, shall:
  - (i) Not extend in any horizontal direction from the discharge port(s) for a distance greater than two hundred feet plus the depth of water over the discharge port(s) as measured during mean lower low water.
  - (ii) Not occupy greater than 25 percent of the width of the waterbody as measured during mean lower low water.
- (b) In estuarine waters, a zone where acute criteria may be exceeded shall not extend beyond 10 percent of the distance established in (a) above, as measured independently from the discharge port(s).
- (c) Vertical limitations for both chronic and acute zones is the depth of water over the discharge port(s) as measured during mean lower low water.

The acute and chronic mixing zone boundaries for discharges from the West Plant and East Plant are determined based on the above definitions and are specified in Condition S1.B of the proposed permit.

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of PLUMES model for both plants. The outfall analysis with PLUMES modeling for the West Plant is included in the January 19, 2006, memorandum from Bill Fox (Cosmopolitan Engineering) to Pat Coxon of City of Bremerton. This memorandum was submitted as an amendment to the *Bremerton Westside WWTP Mixing Zone Study*, Cosmopolitan Engineering, February 2002. The outfall analysis with PLUMES modeling for the East Plant is included in the approved engineering report *City of Bremerton Eastside CSO Treatment Facility*, Camp Dresser & McKee, January 2001. The dilution ratios based on the water quality models are shown in the following table:

Criteria	West Plant		East Plant	
	Acute	Chronic	Acute	Chronic
Aquatic Life	20:1	120:1	51:1	467:1
Human Health		120:1		

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants—their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

#### LIMITS DERIVATION – WEST PLANT

BOD<sub>5</sub>—This discharge with technology-based limitations results in a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Technology-based limitations will be protective of dissolved oxygen criteria in the receiving water.

Temperature—Due to the high dilution achieved (120:1) under critical conditions, there is no predicted violation of the water quality standard for surface waters. Therefore, no effluent limitation for temperature is placed in the proposed permit.

pH—Because of the high buffering capacity of marine water, compliance with the technology-based limits of 6 to 9 will assure compliance with the water quality standards for surface waters.

Fecal Coliform—As stated earlier, the Department is planning to develop waste load allocations for fecal coliform for various point and non-point sources that discharge to Sinclair Inlet. Until then, technology-based fecal coliform limits (200/100 mL monthly average, and 400/100 mL weekly average) are placed in the proposed permit. If the fecal coliform waste load allocation for the West Plant results in lower than permitted effluent limits, the Department will impose the more stringent TMDL-based limits through permit modification or issuance of an Administrative Order.

Toxic Pollutants—Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the water quality standards for surface waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: chlorine, ammonia, heavy metals, cyanide, arsenic, Bis (2-Ethylhexyl) Phthalate, and 1,4-Dichlorobenzene. Concentrations of these pollutants detected in the plant effluent are shown in the table in *EFFLUENT CHARACTERIZATION* section of this fact sheet. A reasonable potential analysis to exceed the water quality criteria was conducted for chlorine, ammonia, heavy metals, cyanide, and arsenic, to determine whether or not effluent limitations for these parameters would be required in this permit.

The determination of the reasonable potential to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix C) at the critical condition in the receiving water. Dilution ratios at the critical condition used in the modeling are: acute dilution ratio 20:1 and chronic dilution ratio 120:1. The reasonable potential analysis is shown in Appendix D of this fact sheet.

Valid ambient background data was available only for ammonia, which was used in the reasonable potential analysis. The analysis shows reasonable potential for chlorine to exceed the water quality criteria. Therefore, lower (than existing) effluent limitations for chlorine are required in the permit. The existing permit has effluent chlorine limits of 0.13 mg/L average monthly and 0.37 mg/L maximum daily. The new chlorine limits based on the dilution ratios at

critical conditions (acute dilution ratio 20:1 and chronic dilution ratio 120:1) in the receiving water are 0.1 mg/L average monthly and 0.3 mg/L maximum daily. The chlorine limits derivation is shown in Appendix F of this fact sheet. These effluent chlorine limits are placed in Condition S1.A of the proposed permit.

#### LIMITS DERIVATION – EAST PLANT

BOD<sub>5</sub>—There is no technology-based effluent limitation for BOD<sub>5</sub> for an intermittently discharging primary treatment plant treating combined sewage. This is an advanced primary treatment plant with BOD<sub>5</sub> and TSS removal efficiencies much greater than those of a conventional primary treatment plant. In addition, the plant influent (combined sewage) is dilute with low concentrations BOD<sub>5</sub> and TSS. With large amounts of dilution occurring in the receiving water at critical conditions, the intermittent discharge from the plant with low effluent BOD<sub>5</sub> is expected to result in negligible water quality impact in the receiving water.

Temperature—Due to the high dilution achieved (467:1) under critical conditions, there is no predicted violation of the water quality standard for surface waters. Therefore, no effluent limitation for temperature is placed in the proposed permit.

pH—Because of the high buffering capacity of marine water, compliance with the technology-based limits of 6 to 9 will assure compliance with the water quality standards for surface waters.

Fecal Coliform—There is no technology-based effluent limitation for fecal coliform for an intermittently discharging primary treatment plant treating combined sewage. However, Ecology's technical guidance document (Section C3-3.3.8, *Disinfection of Criteria for Sewage Works Design*, December 1998) states that 400 counts/100 ml is appropriate for performance for an on-site CSO treatment facility. This limit is placed in the proposed permit.

Toxic Pollutants—Based on results of the effluent analysis during the pilot scale study of the HRC treatment system, a reasonable potential analysis to exceed the water quality criteria was conducted for ammonia, arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc, to determine whether or not effluent limitations for these parameters would be required in this permit.

The determination of the reasonable potential to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix C) at the critical condition in the receiving water. Dilution ratios at the critical condition used in the modeling are: acute dilution ratio 51:1 and chronic dilution ratio 467:1. The dilution analysis and the reasonable potential analysis are included in the approved *City of Bremerton Eastside CSO Treatment Facility Engineering Report*.

Valid ambient background data was available only for ammonia, which was used in the reasonable potential analysis. The analysis shows no reasonable potential for any of the toxics to exceed the water quality criteria. Therefore, no effluent limitations for these parameters are required in the permit.

#### WHOLE EFFLUENT TOXICITY – WEST PLANT

The water quality standards for surface waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the waste water in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their waste water with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sublethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC<sub>50</sub>, EC<sub>50</sub>, IC<sub>25</sub>, and so on. All accredited labs have been provided the most recent version of the Department of Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*, which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call the Ecology Publications Distribution Center at (360) 407-7472 for a copy. Ecology recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice.

Acute toxicity was measured during effluent characterization in the previous permit term. Acute toxicity was found to be at levels that, in accordance with WAC 173-205-050(2)(a), have a reasonable potential to cause receiving water toxicity. An acute toxicity limit is therefore required. The acute toxicity limit is no statistically significant difference in test organism survival between the acute critical effluent concentration (ACEC), 5 percent of the effluent, and the control. Permit Condition S1.A includes the limit for acute toxicity.

The acute toxicity limit is set relative to the zone of acute criteria exceedance (acute mixing zone) established in accordance with WAC 173-201A-100. The acute critical effluent concentration (ACEC) is the concentration of effluent existing at the boundary of the acute mixing zone during critical conditions.

Monitoring for compliance with an acute toxicity limit is accomplished by conducting an acute toxicity test using a sample of effluent diluted to equal the ACEC and comparing test organism survival in the ACEC to survival in nontoxic control water. The Permittee is in compliance with the acute toxicity limit if there is no statistically significant difference in test organism survival between the ACEC and the control.

The WET tests during effluent characterization indicate that no reasonable potential exists to cause receiving water chronic toxicity, and the Permittee will not be given a chronic WET limit, and will only be required to retest the effluent prior to application for permit renewal in order to demonstrate that chronic toxicity has not increased in the effluent.

If the Permittee makes process or material changes which, in the Department's opinion, results in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal. Toxicity is assumed to have increased if WET testing conducted for submission with a permit application fails to meet the performance standards in WAC 173-205-020, "whole effluent toxicity performance standard." The Permittee may demonstrate to the Department that changes have not increased effluent toxicity by performing additional WET testing after the time the process or material changes have been made.

#### HUMAN HEALTH – WEST PLANT

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the effluent contains chemicals of concern for human health. The chemicals of (human health) concern present in the discharge are: arsenic, cyanide, mercury, nickel, Bis (2-Ethylhexyl) Phthalate, and 1,4-Dichlorobenzene. The discharger's high priority status is based on the discharger's status as a major discharger, and knowledge of data indicating regulated chemicals occur in the discharge.

A determination of the discharge's potential to cause an exceedance of the water quality standards was conducted as required by 40 CFR 122.44(d). The reasonable potential determination was evaluated with procedures given in the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001) and the Department's *Permit Writer's Manual* (Ecology Publication 92-109, July 1994). The determination indicated that the discharge has no reasonable potential to cause a violation of water quality standards for human health, thus an effluent limit is not warranted. The reasonable potential analysis is shown in Appendix E of this fact sheet.

#### SEDIMENT QUALITY – WEST PLANT

The Department has promulgated aquatic sediment standards (chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

As required by the existing permit, the Permittee collected and analyzed sediment samples in the vicinity of the West Plant outfall. The Permittee submitted to the Department a Sediment Data Report containing the analysis results. Based on comments provided on the report by the Department staff, the Permittee completed two more sets of sediment sampling and analysis in the vicinity of the outfall. The first set of sampling and analysis was conducted in August 2002, and the second set in April 2003. The analysis results were submitted to the Department by the

Permittee in Sediment Data Reports. After review of these Sediment Data Reports, if the Department determines that there is a potential for violation of the sediment quality standards, the Department may require the Permittee, through an Administrative or Consent Order, to conduct additional sediment monitoring or to apply for a Sediment Impact Zone (SIZ).

### COMBINED SEWER OVERFLOWS

Chapter 173-245 WAC, *Submission of Plans and Reports for Construction and Operation of Combined Sewer Overflow Reduction Facilities*, requires the Permittee to achieve and at least maintain the greatest reasonable reduction at all combined sewer overflow (CSO) sites. As defined in the regulation, “the greatest reasonable reduction” means control of each CSO such that an average of one untreated discharge may occur per year. Definition of “CSO event” (untreated CSO discharge) is included in the *Permit Writer’s Manual* (page V-30), Department of Ecology Publication No. 92-109. The Department of Ecology defines the minimum inter-event period (MIET) for CSOs as 24 hours. A single CSO event would include CSO discharges that are separated by less than 24 hours. A CSO event is considered to have ended only after at least 24 hours has elapsed since the last measured occurrence of an overflow.

As required by WAC 173-245, the Permittee submitted a CSO Reduction Plan to the Department for review and approval in 1992. The Permittee’s *CSO Reduction Plan, October 1992*, was approved by the Department on November 20, 1992. In 2000, the Permittee updated this plan, which reflects changes in the strategy of achieving CSO reduction to comply with the state regulations. The Permittee’s *CSO Reduction Plan Update, October 2000*, was approved by the Department on February 15, 2001. The Permittee is currently implementing this plan, which recommends combination of various CSO reduction alternatives that include storm drainage separation, and storage of combined sewage and subsequent conveyance to and treatment at one of the two treatment plants.

As required by Order on Consent No. DE 93WQ-N150 (and First Amendment to this Order) between the Department of Ecology and the Permittee, the Permittee has completed construction at CSO outfalls OF 13, OF 14 (eliminated), and OF 17, to achieve CSO reduction to an average of one untreated discharge per year. Proposed Permit Condition S10.G requires that CSOs from outfalls OF 13 and OF 17 shall be no more than an average of one event per year, based on a long-term average. The Permittee is required to report the five-year moving average of CSO frequency at these outfalls in the CSO Reduction Plan Amendment to be submitted with the next permit renewal application. The Department, in the near future, is expected to develop post-construction monitoring guidelines for the corrected CSO outfalls. When this is done, inclusion of the post-construction monitoring in future permits for the Permittee’s corrected CSO outfalls will be evaluated.

The Consent Order also requires the Permittee to complete projects at CSO outfalls OF 1, OF 2, OF 3, OF 4, OF 6, OF 7, OF 8, OF 9, OF 10A (now OF 10), OF 11, OF 12, OF 15/15A, and OF 16, by December 31, 2011, to reduce CSOs to an average of one untreated discharge per year. Of these CSO projects, the Permittee has eliminated CSO outfalls OF 15A and OF 15B. Proposed Permit Condition S10.D requires the Permittee to complete these CSO reduction projects in accordance with the schedule stipulated in the Consent Order and any amendment(s) thereto.

As part of the Pacific Avenue Basin CSO Reduction Project, the Permittee is going to abandon the existing CSO outfall OF 16 on the Navy property. After completion of this project, CSOs from this part of the system will be conveyed to and discharged from a storm line in the vicinity of the Bremerton ferry dock.

In accordance with RCW 90.48.480 and chapter 173-245 WAC, proposed permit Condition S10. requires the Permittee to submit an annual combined sewer overflow (CSO) report, and to update its CSO reduction plan at the time of permit renewal.

#### *OUTFALL EVALUATION*

Proposed permit Condition S12 requires the Permittee to conduct an outfall inspection at both plants, and submit a report detailing the findings of that inspection. The purpose of the inspection is to determine the condition of the discharge pipe and diffusers and to determine if sediment is accumulating in the vicinity of the outfall.

#### *GROUND WATER QUALITY LIMITATIONS*

The Department has promulgated ground water quality standards (chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground and therefore no limitations are required based on potential effects to ground water.

#### *COMPARISON OF THE PROPOSED EFFLUENT LIMITS WITH THE EXISTING EFFLUENT LIMITS*

Comparison of the proposed and existing effluent limits is shown in the following table. For the West Plant, the proposed effluent limits for conventional pollutants (BOD, TSS, fecal coliform bacteria, and pH), and chlorine, are same as the existing limits. Due to noncompliance with the performance standard for acute toxicity test during the existing permit term, the proposed effluent limits also include limits for acute toxicity. For the East Plant, the limits for TSS removal efficiency and settleable solids are taken from WAC 173-245. The fecal coliform limits are taken from the guidance in *Criteria for Sewage Works Design*, Department of Ecology, December 1998.

Parameter	Existing Effluent Limits	Proposed Effluent Limits
<b>West Plant</b>		
BOD <sub>5</sub> (average monthly concentration)	30 mg/L	30 mg/L
TSS (average monthly concentration)	30 mg/L	30 mg/L
Fecal Coliform (average monthly concentration)	200/100 mL	200/100 mL
pH (standard units)	6.0 to 9.0	6.0 to 9.0
Total Residual Chlorine (average monthly concentration)	0.13 mg/L	0.1 mg/L
Acute Toxicity	None	No acute toxicity in a whole effluent toxicity (WET) test concentration representing the acute critical effluent concentration (ACEC) of 5% effluent.
<b>East Plant</b>		
TSS Removal Efficiency (yearly average)	NA	50%
Settleable Solids (yearly average)	NA	0.3 ml/l/hr.
Fecal Coliform Bacteria (monthly average)	NA	400/100 mL (geometric mean)

## MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

The monitoring schedule is detailed in the proposed permit under Condition S2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. Agency guidance for required monitoring frequencies for wastewater treatment plants is given in the current version of Ecology's *Permit Writer's Manual* (July 2002). The guidance for monitoring frequency for the West Plant is given in the subsection for *activated sludge plants with greater than 5 MGD average design flow*. The suggested monitoring frequencies given in the guidance for BOD and TSS are five/week, and for fecal coliform, daily. The monitoring frequencies for these parameters in the proposed are same as the existing permit, which are three/week for BOD

and TSS, and five/week for fecal coliform. As stated above in the *SUMMARY OF COMPLIANCE WITH THE EXISTING PERMIT* section of this fact sheet, based on DMRs submitted to the Department, the Permittee has consistently remained in compliance with the effluent limits and there have been no exceedance of influent design criteria since February 1999. Therefore, monitoring of these parameters at the existing level is deemed sufficient.

Priority pollutants and conventional pollutants monitoring is required for reporting in the next permit application. Monitoring for toxics (metals and cyanide) has been continued from the previous permit in order to continue monitoring for the influence of industrial discharges. Monitoring for additional nitrogen compounds (nitrite, nitrate, and TKN or total nitrogen) is required for use by the Department in the Sinclair Inlet TMDL study.

#### *LAB ACCREDITATION*

With the exception of certain parameters, the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at this facility is accredited for BOD, TSS, ammonia, fecal coliform and pH. Samples for analyzing other parameters are sent to commercial laboratories.

### **OTHER PERMIT CONDITIONS**

#### *REPORTING AND RECORD KEEPING*

The conditions of S3 are based on the authority to specify any appropriate reporting and record keeping requirements to prevent and control waste discharges (WAC 173-220-210).

#### *PREVENTION OF FACILITY OVERLOADING*

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit Requirement S4 to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants.

#### *OPERATION AND MAINTENANCE (O&M)*

The proposed permit contains Condition S5 as authorized under RCW 90.48.110, WAC 173-220-150, chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

### *RESIDUAL SOLIDS HANDLING*

To prevent water quality problems, the Permittee is required in permit Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and state water quality standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under chapter 70.95J RCW and chapter 173-308 WAC. The disposal of other solid waste is under the jurisdiction of the Bremerton/Kitsap County Health Department.

### *PRETREATMENT*

Since the pretreatment program has not been delegated to the Permittee, the pretreatment Condition S8 in the permit is a standard condition derived from the Federal Regulation 40 CFR 403.5.

### *GENERAL CONDITIONS*

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

## **PERMIT ISSUANCE PROCEDURES**

### *PERMIT MODIFICATIONS*

The Department may modify this permit to impose numerical limitations, if necessary, to meet water quality standards, sediment quality standards, or ground water standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

### *RECOMMENDATION FOR PERMIT ISSUANCE*

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the state of Washington. The Department proposes that this permit be issued for the full allowable five (5)-year period.

## REFERENCES FOR TEXT AND APPENDICES

### Environmental Protection Agency (EPA)

1995. Combined Sewer Overflow Guidance for Permit Writers.
1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.
1991. Technical Support Document for Water Quality-based Toxics Control.  
EPA/505/2-90-001.
1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

### Washington State Department of Ecology

- Laws and Regulations <http://www.ecy.wa.gov/laws-rules/index.html>
- Permit and Wastewater Related Information  
<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>
1994. Permit Writer's Manual. Publication Number 92-109

### City of Bremerton

2005. City of Bremerton Wastewater Comprehensive Plan Update (Final Draft),  
Camp Dresser & McKee
2002. Westside WWTP Mixing Zone Study, Cosmopolitan Engineering
2001. Westside Wastewater Treatment Plant Rerating Study, Camp Dresser & McKee and  
Richwine Environmental, Inc.
2001. Eastside CSO Treatment Facility Engineering Report, Camp Dresser & McKee
2000. CSO Reduction Plan Update, HDR Engineering

## APPENDIX A—PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page one of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public Notice of Application (PNOA) was published on September 6 and 13, 2002, in the *Bremerton Sun*, to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on XXXX in the *Bremerton Sun* to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Coordinator  
Department of Ecology  
Northwest Regional Office  
3190 – 160<sup>th</sup> Avenue SE  
Bellevue, WA 98008-5452

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30)-day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone (425) 649-7201, or by writing to the address above.

## APPENDIX B—GLOSSARY

### CSO RELATED TERMINOLOGY

#### GLOSSARY OF CSO TERMS (from EPA's CSO Guidance for Permit Writers)

**Average Number of Overflow Events Per Year**—The total number of combined sewer overflow events that occurred during the term of the permit divided by the permit term in years.

**Combined Sewer Overflow**—The discharge from a combined sewer system to a receiving water of the United States prior to reaching the publicly owned treatment works treatment plant.

**Combined Sewer Overflow Event**—The discharges from any number of points in the combined sewer system resulting from a single wet weather event that do not receive minimum treatment (that is, primary clarification, solids disposal, and disinfection, where appropriate). For example, if a storm occurs that results in untreated overflows from 50 different CSO outfalls within the CSS, this is considered one overflow event.

**Combined Sewer System**—A wastewater collection system owned by a state or one or more municipalities (as defined by Section 502(4) of the Clean Water Act) which conveys sanitary wastewaters (domestic, commercial, and industrial wastewaters) and storm water through a single-pipe system to a publicly owned treatment works treatment plant [as defined in 40 CFR 403.3(p)].

**Dry Weather Flow Conditions**—Hydraulic flow conditions within the combined sewer system resulting from one or more of the following: flows of domestic sewage, ground water infiltration, commercial and industrial wastewaters, and any other nonprecipitation event-related flows (for example, tidal infiltration under certain circumstances). Other nonprecipitation event-related flows that are included in dry weather flow conditions will be decided by the permit writer based on site-specific conditions.

**Dry Weather Overflow**—A combined sewer overflow that occurs during dry weather flow conditions.

**Precipitation Event**—An occurrence of rain, snow, sleet, hail, or other form of precipitation. Precipitation events are generally characterized by parameters of duration and intensity (inches or millimeters per unit of time). This definition will be highly site-specific. For example, a precipitation event could be defined as 0.25 inches or more of precipitation in the form of rain or 3 inches or more of precipitation in the form of sleet or snow, reported during the preceding 24-hour period at a specific gaging station. A precipitation event could also be defined by a minimum time interval between measurable amounts of precipitation (for example, 6 hours between the end of rainfall and the beginning of the next rainfall).

**Primary Clarification or Equivalent**—The level of treatment that would typically be provided by one or more treatment technologies under peak wet weather flow conditions. Options for defining primary clarification include a design standard (for example, side wall depth and maximum overflow rate), a performance standard (for example, percent removal), or an effluent standard (for example, concentration of pollutants). "Equivalent to primary clarification" is site-specific and includes any single technology or combination of technologies shown by the Permittee to achieve primary clarification under the presumption approach. The Permittee is responsible for showing equivalency to primary treatment as part of the evaluation of CSO control alternatives during LTCP development. Primary clarification is discussed in more detail in the Combined Sewer Overflows-Guidance for Long-term Control Plan (EPA, 1995a).

**Sensitive Areas**—Areas of particular environmental significance or sensitivity that could be adversely affected by a combined sewer overflow, including Outstanding National Resource Waters, National Marine Sanctuaries, water with threatened or endangered species, waters with primary contact recreation, public drinking water intakes, shellfish beds, and other areas identified by the Permittee or National Pollutant Discharge Elimination System permitting authority, in coordination with the appropriate state or federal agencies.

**Solid and Floatable Materials**—Solid or semi-solid materials should be defined on a case-by-case basis determined by the control technologies proposed by the Permittee to control these materials. The term generally includes materials that might impair the aesthetics of the receiving waterbody.

**Wet Weather Flow Conditions**—Hydraulic flow conditions within the combined sewer system resulting from a precipitation event. Since the definition of precipitation event is site-specific, the permit writer should evaluate and define certain site-specific weather conditions that typically contribute to wet weather flow. EPA encourages permit writers to include snowmelt as a condition that typically contributes to wet weather flow.

#### **GLOSSARY OF CSO TERMS (from Ecology's Permit Writer's Manual, page v-23)**

**Combined Sewer Overflow (CSO)**—An event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

**Event**—A CSO event is defined as a 24-hour minimum inter-event time for a CSO outfall.

**Inter-Event Time (IET)**—The dry period or time steps between storm or CSO events. A CSO event is defined as a 24-hour minimum inter-event time for a CSO outfall.

**Minimum Inter-Event Time (MIET)**—The amount of dry time or non-overflow time required to indicate a storm event or CSO event is independent ( $CV = 1$ ).

**Storm Duration**—The time from the first wet time step at the beginning of the storm event to the last wet time step ending the event.

**Storm Event**—A period of rainfall separated from other wet time steps by a dry period equal to or greater than the minimum precipitation inter-event time.

**Storm Inter-Arrival Time**—The time from the beginning of one storm event to the beginning of the next storm event (equal to one storm duration and one inter-event time).

**Threshold Rainfall**—The amount of rainfall necessary to cause runoff. In the Portland, Oregon area this varies from 0.05 to 0.1 inch, depending on length of the storm.

**Wet Time Steps**—A time increment in a precipitation record in which a measurable amount of precipitation occurs. The measurable amount may be defined as threshold rainfall.

### **GENERAL TERMINOLOGY**

**Acute Toxicity**—The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

**AKART**—An acronym for “all known, available, and reasonable methods of prevention, control, and treatment.”

**Ambient Water Quality**—The existing environmental condition of the water in a receiving water body.

**Ammonia**—Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

**Average Monthly Discharge Limitation**—The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

**Average Weekly Discharge Limitation**—The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Best Management Practices (BMPs)**—Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

**BOD<sub>5</sub>**—Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD<sub>5</sub> is used in modeling to measure the reduction of dissolved oxygen in a receiving waterbody after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

**Bypass**—The intentional diversion of waste streams from any portion of a treatment facility.

**CBOD<sub>5</sub>**—The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celsius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD<sub>5</sub> is given in 40 CFR Part 136.

**Chlorine**—Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

**Chronic Toxicity**—The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

**Clean Water Act (CWA)**—The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

**Combined Sewer Overflow (CSO)**—The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

**Compliance Inspection - Without Sampling**—A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

**Compliance Inspection - With Sampling**—A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

**Composite Sample**—A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

**Construction Activity**—Clearing, grading, excavation, and any other activity which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

**Continuous Monitoring**—Uninterrupted, unless otherwise noted in the permit.

**Critical Condition**—The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

**Dilution Factor**—A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction, for example, a dilution factor of 10 means the effluent comprises 10 percent by volume and the receiving water 90 percent.

**Engineering Report**—A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

**Fecal Coliform Bacteria**—Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

**Grab Sample**—A single sample or measurement taken at a specific time or over as short period of time as is feasible.

**Industrial User**—A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

**Industrial Wastewater**—Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

**Infiltration and Inflow (I/I)**—"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, and so on, into a sewer.

**Interference**—A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued there under (or more stringent state or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) [including Title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including state regulations contained in any state sludge management plan prepared pursuant to Subtitle D of the SWDA], sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

**Major Facility**—A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Maximum Daily Discharge Limitation**—The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Method Detection Level (MDL)**—The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

**Minor Facility**—A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Mixing Zone**—A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (chapter 173-201A WAC).

**National Pollutant Discharge Elimination System (NPDES)**—The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

**Pass Through**—A discharge which exits the POTW into waters of the state in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of state water quality standards.

**pH**—The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

**Potential Significant Industrial User**—A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges waste water meeting one or more of the following criteria:

- a. Exceeds 0.5 percent of treatment plant design capacity criteria and discharges <25,000 gallons per day; or
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (for example, facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

**Quantitation Level (QL)**—A calculated value five times the MDL (method detection level).

**Significant Industrial User (SIU)**—

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; and
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process waste stream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority\* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority\* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

\*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

**State Waters**—Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

**Stormwater**—That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

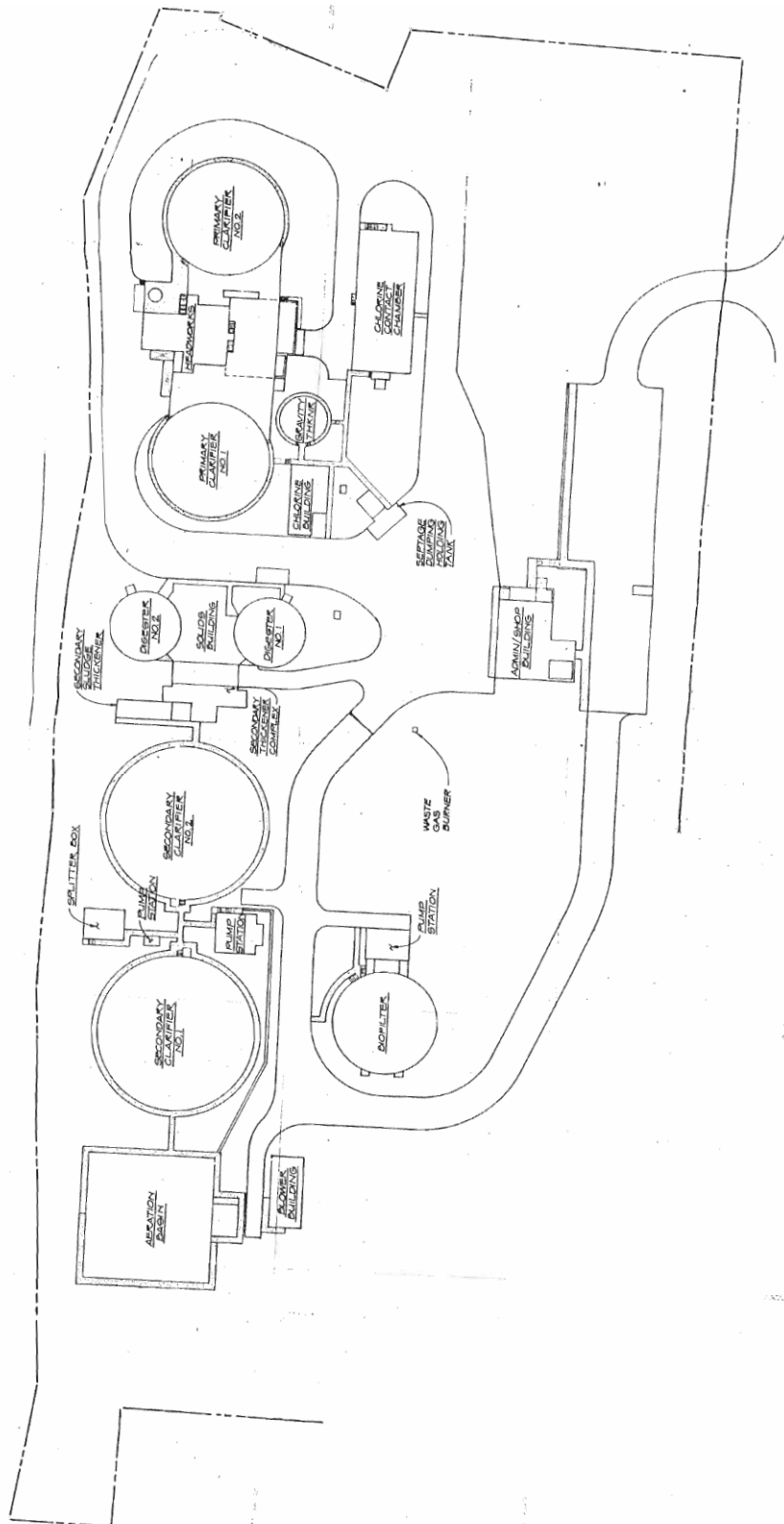
**Technology-based Effluent Limit**—A permit limit that is based on the ability of a treatment method to reduce the pollutant.

**Total Suspended Solids (TSS)**—Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving waterbody may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

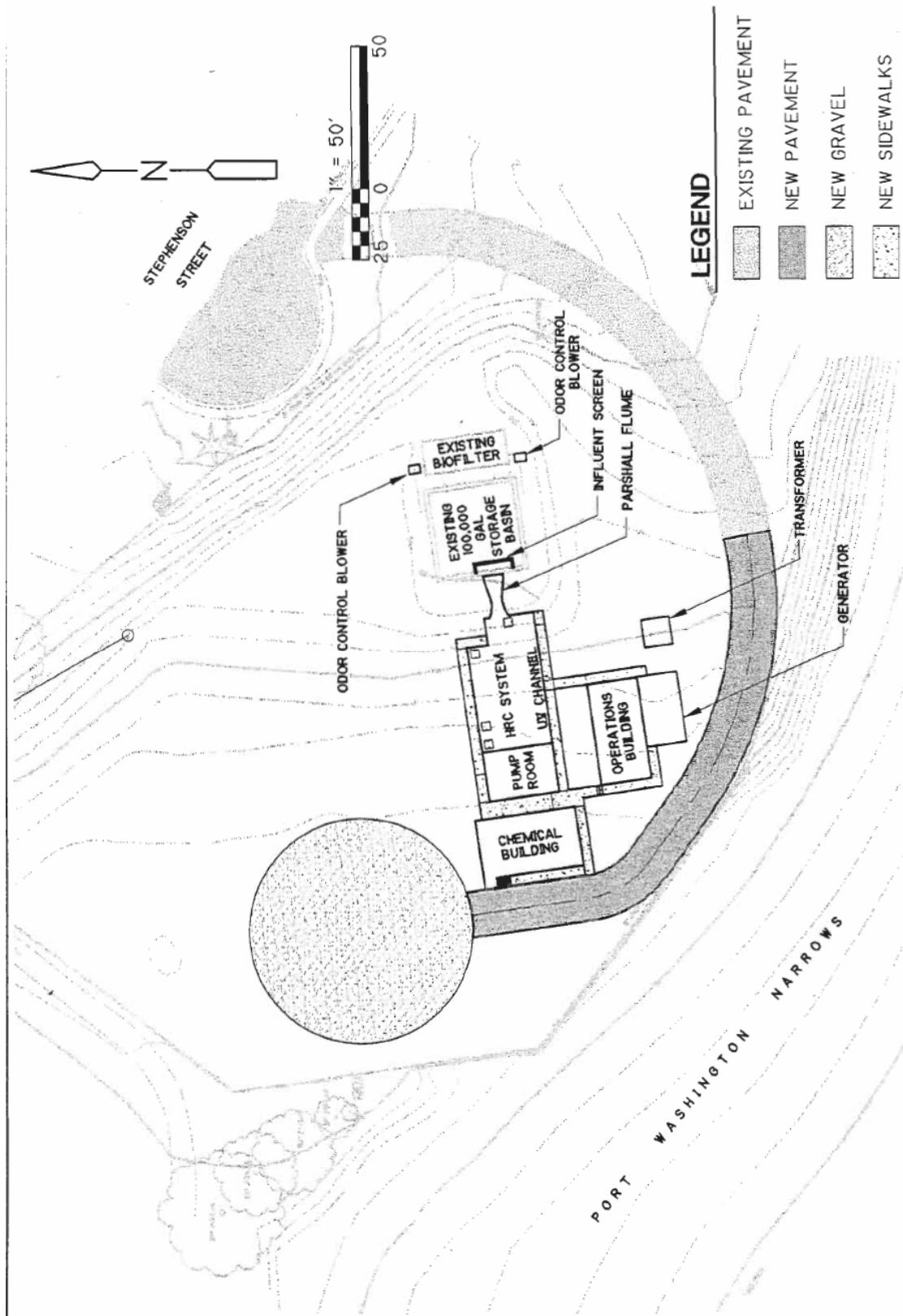
**Upset**—An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

**Water Quality-based Effluent Limit**—A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving waterbody.

## WEST PLANT



# EAST PLANT



## APPENDIX D—REASONABLE POTENTIAL CALCULATION FOR WATER QUALITY CRITERIA

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at (<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>)

### AMMONIA WATER QUALITY CRITERIA CALCULATION

Calculation of seawater fraction of un-ionized ammonia  
from Hampson (1977). Un-ionized ammonia criteria for  
salt water are from EPA 440/5-88-004.

Based on Lotus File NH3SALT.WK1 Revised 19-Oct-93

INPUT	
1. Temperature (deg C):	18.0
2. pH:	8.4
3. Salinity (g/Kg):	28.0
OUTPUT	
1. Pressure (atm; EPA criteria assumes 1 atm):	1.0
2. Molal Ionic Strength (not valid if >0.85):	0.574
3. pKa8 at 25 deg C (Whitfield model "B"):	9.312
4. Percent of Total Ammonia Present as Unionized:	6.776%
5. Unionized ammonia criteria (mg un-ionized NH3 per liter) from EPA 440/5-88-004	
Acute:	0.233
Chronic:	0.035
6. Total Ammonia Criteria (mg/L as NH3)	
Acute:	3.44
Chronic:	0.52
7. Total Ammonia Criteria (mg/L as NH3-N)	
Acute:	2.83
Chronic:	0.42

## REASONABLE POTENTIAL CALCULATION TO DETERMINE EXCEEDANCE OF WATER QUALITY-BASED CRITERIA

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)										CALCULATIONS					COMMENTS				
Parameter	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	State Water Quality Standard	Max concentration at edge of...	Chronic Mixing Zone	Acute Mixing Zone	Chronic Mixing Zone	Chronic Mixing Zone	Effluent percentile value	Pn	Max effluent measured (metals as recoverable)	Coeff Variation	s	# of samples n	Multiplier	Acute Df'n Factor	Chronic Df'n Factor	
Ammonia - N				2830.00	420.00	1624.93	270.82	NO	0.95	0.993	47000.00	0.47	0.45	443	0.69	20	120		
Chlorine				13.00	7.50	15.08	2.51	YES	0.95	0.973	350.00	0.57	0.53	109	0.96	20	120		
Cyanide				1.00	1.00	0.65	0.11	NO	0.95	0.951	13.00	0.35	0.34	60	1.00	20	120		Most samples below MDL.
Arsenic				69.00	36.00	0.16	0.03	NO	0.95	0.951	3.30	0.42	0.40	60	0.99	20	120		
Cadmium				42.00	9.30	0.04	0.01	NO	0.95	0.951	0.80	0.62	0.57	60	0.99	20	120		All but one sample below MDL.
Chromium (Hex)				1100.00	50.00	3.83	0.64	NO	0.95	0.951	78.00	2.43	1.39	60	0.98	20	120		Most samples below MDL.
Copper				4.80	3.10	1.34	0.22	NO	0.95	0.951	27.10	0.87	0.75	60	0.99	20	120		Maximum Effluent Concentration Measured = 0.8 ug/l
Lead				210.00	8.10	0.99	0.16	NO	0.95	0.951	20.00	1.05	0.86	60	0.99	20	120		Maximum Effluent Concentration Measured = 20 ug/l
Mercury				1.80	0.025	0.01	0.00	NO	0.95	0.951	0.28	1.60	1.13	60	0.99	20	120		All but two samples below MDL.
Nickel				74.00	8.20	0.79	0.13	NO	0.95	0.951	16.00	0.68	0.62	60	0.99	20	120		Maximum Effluent Concentration Measured = 0.28 ug/l
Zinc				90.00	81.00	9.39	1.57	NO	0.95	0.951	190.00	1.15	0.92	60	0.99	20	120		Most samples below MDL.

## APPENDIX E—REASONABLE POTENTIAL CALCULATION FOR PROTECTION OF HUMAN HEALTH

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at

<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>

Parameter	Ambient Concentration (Geometric Mean)	Water Quality Criteria for Protection of Human Health	Max concentration at edge of chronic mixing zone	LIMIT REQ'D?	Expected Number of Compliance Samples per Month	AVERAGE MONTHLY EFFLUENT LIMIT	MAXIMUM DAILY EFFLUENT LIMIT	Estimated Percentile at 95% Confidence	Pn	Max effluent conc. measured	Coeff Variation	# of samples from which # in col. K was taken	Multiplier	Calculated 50th percentile Effluent Conc. (When n>10)	Dilution Factor	COMMENTS
	ug/L	ug/L	ug/L			ug/L	ug/L			ug/L	CV	n	S			
Revised 3100																
ARSENIC (inorganic)		0.14	0.01	NO	4	NONE	NONE	0.50	0.95	3.30	0.42	60	0.51	1.40	120	28 samples below MDL. Detected Max. Conc. 3.3 ug/l
CYANIDE		220000	0.08	NO	4	NONE	NONE	0.50	0.95	13.00	0.35	60	0.57	9.50	120	Most samples below MDL. Maximum Effluent Concentration Measured = 13 ug/l
MERCURY		0.15	0.00	NO	4	NONE	NONE	0.50	0.95	0.28	1.60	60	0.15	0.20	120	All but two samples below MDL. Maximum Effluent Concentration Measured = 0.28 ug/l
NICKEL		4600	0.05	NO	4	NONE	NONE	0.50	0.95	16.00	0.68	60	0.36	5.60	120	Most samples below MDL. Maximum Effluent Concentration Measured = 16 ug/l
1,4 DICHLOROBENZENE		2600	0.06	NO	1	NONE	NONE	0.50	0.22	4.50	0.60	2	1.52		120	
BIS(2-ETHYL-HEXYL) PHTHALATE		5.9	0.25	NO	1	NONE	NONE	0.50	0.22	20.00	0.60	2	1.52		120	

## APPENDIX F—WATER QUALITY-BASED PERMIT LIMITS CALCULATIONS FOR CHLORINE

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at <http://www.ecy.wa.gov/programs/wq/wastewater/index.html>

PARAMETER	Dilution (Dil'n) factor is the inverse of the percent effluent concentration at the edge of the acute or chronic mixing zone.										Permit Limit Calculation Summary					Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations							Statistical variables for permit limit calculation				
	Acute Dil'n Factor	Chronic Dil'n Factor	Metal Criteria Translat or	Metal Criteria Translat or	Ambient Concentr ation	Water Quality Standard Acute	Water Quality Standard Chronic	Average Monthly Limit (AML)	Maximum Daily Limit (MDL)	Comments	WLA Acute ug/L	WLA Chronic ug/L	LTA Acute ug/L	LTA Chronic ug/L	LTA Prob'y Basis (CV)	Coef. Var. (CV)	AML Prob'y Basis	MDL Prob'y Basis	# of Samples per Month	n							
Chlorine	20	120				13.00	7.50	103.7	271.4		260	900.00	87.1	488.5	0.57	0.99	87.1	0.60	0.95	0.99	30.00	1.00					
This spreadsheet calculates water quality-based permit limits based on the two value steady state model using the State Water Quality Standards contained in WAC 173-201A. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March 1991 (EPA/505/2-90-001) on page 99. Last revision date 9/98.																											

**APPENDIX G—LIST OF POLLUTANTS FOR TESTING  
REQUIRED IN PERMIT CONDITION S2.A.1.(3)**

**EPA "PART D" NPDES APPLICATION FORM 2A TESTING REQUIREMENTS**

The following pollutant scan data are required at the time of NPDES permit application for municipal treatment facilities with design flow greater than 1.0 mgd. At least three scans are to be conducted during the term of the permit. The metals are to be analyzed as "Total recoverable Metals" Section 4.1.4, Publication EPA-600/4-79-020, *Methods for Chemical Analysis of water and Wastes*, 1979. Please see Condition S2.A(4) of the permit.

<b>METALS &amp; MISC.</b>	<b>VOL. ORGANICS (Cont.)</b>	<b>BASE NEUTRALS (Cont.)</b>
Antimony	Ethylbenzene	Bis (2-Chloroethyl)-Ether
Arsenic	Methyl Bromide	Bis (2-Chloroiso-Propyl) Ether
Beryllium	Methyl Chloride	Bis (2-Ethylhexyl) Phthalate
Cadmium	Methylene Chloride	4-Bromophenyl Phenyl Ether
Chromium	1,1,2,2-Tetrachloro-Ethane	Butyl Benzyl Phthalate
Copper	Tetrachloro-Ethylene	2-Chloronaphthalene
Lead	Toluene	4-Chlorophenyl Phenyl Ether
Mercury	1,1,1-Trichloroethane	Chrysene
Nickel	1,1,2-Trichloroethane	Di-N-Butyl Phthalate
Selenium	Trichlorethylene	Di-N-Octyl Phthalate
Silver	Vinyl Chloride	Dibenzo(A,H) Anthracene
Thallium		1,2-Dichlorobenzene
Zinc	<b>ACID EXTRACTABLES</b>	1,3-Dichlorobenzene
Cyanide	P-Chloro-M-Cresol	1,4-Dichlorobenzene
Total Phenolic Compounds	2-Chlorophenol	3,3-Dichlorobenzidine
Hardness (As CaCO <sub>3</sub> )	2,4-Dichlorophenol	Diethyl Phthalate
	2,4-Dimethylphenol	Dimethyl Phthalate
<b>VOLATILE ORGANICS</b>	4,6-Dinitro-O-Cresol	2,4-Dinitrotoluene
Acrolein	2,4-Dinitrophenol	2,6-Dinitrotoluene
Acrylonitrile	2-Nitrophenol	Fluoranthene
Benzene	4-Nitrophenol	Fluorene
Bromoform	Pentachlorophenol	Hexachlorobenzene
Carbon Tetrachloride	Phenol	Hexachlorobutadiene
Chlorobenzene	2,4,6-Trichlorophenol	Hexachlorocyclo-Pentadiene
Chlorodibromo-Methane		Hexachloroethane
Chloroethane	<b>BASE NEUTRALS</b>	Indeno(1,2,3-CD)Pyrene
2-Chloro-Ethylvinyl Ether	Acenaphthene	Isophorone
Chloroform	Acenaphthylene	Naphthalene
Dichlorobromo-Methane	Anthracene	Nitrobenzene
1,1-Dichloroethane	Benzidine	N-Nitrosodi-N-Propylamine
1,2-Dichloroethane	Benzo(A)Anthracene	N-Nitrosodi-Methylamine
Trans-1,2-Dichloro Ethylene	3,4 Benzo-Fluoranthene	N-Nitrosodi-Phenylamine
1,1-Dichloroethylene	Benzo(Ghi)Perylene	Phenanthrene
1,2-Dichloropropane	Benzo(K)Fluoranthene	Pyrene
1,3-Dichloro-Propylene	Bis (2-Chloroethoxy) Methane	1,2,4-Trichlorobenzene

**APPENDIX H—RESPONSE TO COMMENTS**